

REMARKS

This application has been reviewed in light of the Office Action dated July 2, 2003. Claims 1-5, 7, and 9-25 are pending in this application. Claims 1 and 10-19 have been amended to define still more clearly what Applicants regard as their invention, in terms that distinguish over the art of record. Applicants note that Claims 11-16 have been amended as to matters of form only and those amendments do not narrow the scope of any of those claims. Claims 1 and 10 are in independent form. Favorable reconsideration is requested.

The Office Action rejected Claims 1, 17-19 (as dependent from Claim 1), and 23 under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,351,229 (Brezoczsky et al.); rejected Claims 2-4, 9, and 17-19 under 35 U.S.C. § 103(a) as being unpatentable over Brezoczsky et al.; Claims 5, 7, and 17-19 as being unpatentable over Brezoczsky et al. in view of U.S. Patent No. 5,354,985 (Quate); Claims 10-14, 16, and 20-22 as being unpatentable over Quate in view of U.S. Patent No. 6,396,050 B1 (Yamamoto et al.); and Claims 15 and 20-22 as being unpatentable over Quate in view of Yamamoto et al., and further in view of U.S. Patent No. 5,902,715 (Tsukamoto et al.). Applicants respectfully traverse these rejections.

Applicants submit that amended independent Claims 1 and 10, together with the remaining claims dependent thereon, are patentably distinct from the cited prior art at least for the following reasons.

Claim 1 is directed to a probe for detecting near-field light or irradiating near-field light. The probe includes a cantilever supported at an end thereof by a substrate, a hollow tip formed at a free end of the cantilever, a microaperture for utilizing near field light formed at the end of the tip, and a groove formed inside the cantilever, in which the groove includes a hollow waveguide and a mirror. The mirror reflects the light entering

from the microaperture toward the hollow waveguide or reflects the light transmitted in the hollow waveguide toward the microaperture.

A notable feature of Claim 1 is that the probe and the microaperture utilize near-field light. Support in the specification for this feature can be found at least from page 8, line 25, to page 9, line 7. (It is to be understood, of course, that the scope of Claim 1 is not limited by the details of this embodiment.)

Brezoczsky et al., as understood by Applicants, relates to a tribo-attractive contact slider for an optical read/write system. In Brezoczsky et al., an optical head physically comes into contact with an optical recording medium. Applicants submit that since the optical head physically comes into contact with the optical recording medium, the Brezoczsky et al. apparatus does not use near-field light, and Applicants have found nothing in Brezoczsky et al. that would teach or suggest the use of near-field light. In addition, Applicants note that the slider 51 and aperture 75 (see FIG. 5) correspond to the hollow tip and the microaperture of a probe having the features recited in Claim 1. Applicants submit, however, that the microaperture as provided in Claim 1 is used for near-field light and therefore, it is necessary that the opening thereof be smaller than a wavelength of the light, e.g., 100 nm or less. As a result, the aperture 75 of Figure 5 of Brezoczsky et al. does not suggest the recited characteristics of the aperture recited in Claim 1.

Accordingly, Applicants submit that at least for these reasons, Claim 1 is patentable over Brezoczsky et al.

Claim 10 is directed to a method for producing a probe for utilizing near field light. The method includes the steps of working a first substrate to form a groove and a mirror in the groove, forming a flat cover portion on the groove to form a hollow waveguide having an opening in a part thereof, and preparing a second substrate having a

recess portion. The method also includes the steps of forming a layer to become a tip layer in the recess portion, aligning the first substrate having the flat cover portion and the second substrate such that the flat cover portion and the layer are in contact with each other, detaching the second substrate from the first substrate to form a hollow tip having a microaperture on the opening, and removing a part of the first substrate by etching, to form a cantilever.

Notable features of Claim 10 are that the probe utilizes near-field light, and that the hollow tip is formed by aligning and detaching two substrates. Support in the specification can be found at least at page 18, lines 9-16, with reference to Figure 2D, and page 20, lines 14-21, with reference to Figure 2E. (It is to be understood, of course, that the scope of Claim 10 is not limited by the details of this embodiment.)

Quate, as understood by Applicants, relates to a near field scanning optical and force microscope that includes a cantilever and an optical waveguide. Quate discusses a near-field scanning optical microscope (NSOM) that includes a cantilever. For example, Figures 4A-4D show the process of a cantilever being formed (see the description in the specification at column 5, line 53, to column 6, line 23). In this process, while aperture 25 (see, e.g., Fig. 1D) is formed by forming an Al layer 24 on Si₃N₄ layer 23, nothing in these figures show, and nothing in the specification would teach or suggest, forming the hollow tip by aligning and detaching two substrates, as recited in Claim 10.

Yamamoto et al., as understood by Applicants, relates to a self-emitting optical probe, a method for producing the same, and a scanning near-field optical microscope. Applicants submit that nothing has been found in Yamamoto et al. that would teach or suggest forming the hollow tip by aligning and detaching two substrates, as recited in Claim 10.

Accordingly, at least for the reasons described above, Applicants submit

that Claim 10 is patentable over Quate and Yamamoto et al., when taken separately or in any proper combination.


A review of the other art of record, including Tsukamoto et al., has failed to reveal anything which, in Applicants' opinion, would remedy the deficiencies of the art discussed above, as references against the independent claims herein. Those claims are therefore believed patentable over the art of record.

The other rejected claims in this application are each dependent from one or another of independent Claims 1 and 10 discussed above and are therefore believed patentable for the same reasons. Since each dependent claim is also deemed to define an additional aspect of the invention, however, the individual reconsideration of the patentability of each on its own merits is respectfully requested.

In view of the foregoing amendments and remarks, Applicants respectfully request favorable reconsideration and early passage to issue of the present application.

Applicants' undersigned attorney may be reached in our New York Office by telephone at (212) 218-2100. All correspondence should continue to be directed to our address listed below.

Respectfully submitted,


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